

1 **ELECTRONIC BOOK WITH VOICE EMULATION FEATURES**

2 **Related Applications**

3 This application is a continuation-in-part of U.S. Application Serial No.
4 08/336,247 entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM,
5 filed November 7, 1994, and U.S. Application Serial No. 08/160,194, entitled
6 ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY
7 SYSTEMS, filed December 2, 1993, and U.S. Application Serial No. 08/906,469, entitled
8 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON
9 A TELEVISION PROGRAM DELIVERY SYSTEM, filed August 5, 1997 which is a
10 continuation of U.S. Application Serial No. 08/160,281, entitled TERMINAL FOR
11 SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY
12 SYSTEM, filed December 2, 1993, which is now U.S. Patent No. 5,798,785, dated
13 August 25, 1998, all of which are incorporated herein by reference.

14 This application is related to U.S. Application Serial No. 09/237,828, filed on
15 January 27, 1999, entitled ELECTRONIC BOOK ELECTRONIC LINKS, U.S.
16 Application Serial No. 09/289,957, filed on April 13, 1999, entitled ELECTRONIC
17 BOOK ALTERNATIVE DELIVERY SYSTEMS, and U.S. Application Serial No.
18 09/289,956, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE
19 DELIVERY METHODS, all of which are incorporated herein by reference.

20 **Technical Field**

21 This invention is directed to an electronic book unit having one or more electronic
22 books. More specifically, the invention relates to an apparatus and method for providing
23 text-to-speech and speech recognition features for electronic books.

24 **Background Art**

25 Sparked by the concept of an information superhighway, a revolution will take
26 place in the distribution of books. Not since the introduction of Gutenberg's movable
27 typeset printing has the world stood on the brink of such a revolution in the distribution
28 of text material. The definition of the word "book" will change drastically in the near
29 future. Due to reasons such as security, convenience, cost, and other technical problems,

1 book and magazine publishers are currently only able to distribute their products in paper
2 form. This invention solves the problems encountered by publishers.

3 **Summary Of Invention**

4 Methods and apparatus consistent with the present invention include features for
5 text-to-speech conversion and speech recognition for electronic books. In one
6 embodiment, the methods and apparatus display a page of an electronic book on a viewer,
7 the page including text. They receive a selection of text on the displayed page for
8 conversion to speech and convert at least a portion the selected text into the
9 corresponding speech. They may alternatively automatically display a next page of the
10 electronic book and convert at least a portion of text on the next page into corresponding
11 speech, or automatically perform the conversion upon selection of the next page by a
12 user.

13 For speech recognition, the methods and apparatus receive speech from a user.
14 They convert the speech into corresponding electronic text and inserting the text into the
15 electronic book.

16 For voice or audible commands, the methods and apparatus receive an audible
17 command relating to a function of the electronic book. They convert the audible
18 command into a corresponding electronic signal and execute the function in response to
19 the electronic signal.

20 For voice security, the methods and apparatus store an electronic book for display
21 on a viewer. They receive an audible command from a user relating to a function of the
22 electronic book and convert the audible command into a corresponding electronic signal.
23 Commands from the user, relating to the electronic book, are executed only if the
24 electronic signal satisfies particular criteria.

25 **Brief Description Of Drawings**

26 Figure 1 is a block diagram of the primary components of the electronic book
27 selection and delivery system.

1 Figure 2 is a schematic showing an overview of the electronic book selection and
2 delivery system.

3 Figure 3a is a schematic of the delivery plan for the electronic book selection and
4 delivery system.

5 Figure 3b is a schematic of an alternate delivery plan.

6 Figure 4 is a block diagram of an operations center.

7 Figure 5a is a flow diagram of the processing at the operations center and uplink.

8 Figure 5b is a block diagram of the hardware configuration for an uplink site.

9 Figure 6a is a block diagram of the hardware configuration for a four component
10 home subsystem.

11 Figure 6b is a schematic of a two unit home subsystem.

12 Figure 7 is a flow diagram of the processes performed by the video connector.

13 Figure 8 is a block diagram for an example of a library unit.

14 Figure 9 is a flow diagram of some of the processes performed by the library on
15 the received data stream.

16 Figure 10 is a flow diagram of the processes performed by the library unit on
17 information requests from the viewer.

18 Figure 11 is a block diagram showing the components for an example of a viewer.

19 Figure 12 is a flow diagram of some of the processes performed by the viewer on
20 an information request from a subscriber.

21 Figure 13 is a chart depicting the menu structure and sequencing of menus in the
22 menu system.

23 Figure 14a is a schematic of an introductory menu.

24 Figure 14b is a schematic showing an example of a main menu.

25 Figures 14c, 14d, 14e, 14f, 14g, 14h, 14i and 14j are schematics showing
26 examples of submenus.

27 Figure 15 is a schematic diagram of an electronic book system for a bookstore or
28 public library.

1 Figure 16a and Figure 16b are schematics of hardware modifications or upgrades
2 to a set top converter.

3 Figure 17 is a schematic showing a set top terminal that includes a data receiver
4 and data transmitter.

5 Figure 18a is a schematic of a book-on-demand system.

6 Figure 18b is a schematic of an operations center supporting a book-on-demand
7 system.

8 Figure 19 is a diagram of a main menu screen for presenting on a viewer voice
9 emulation options for electronic books.

10 Figure 20 is a flow chart of a main menu routine.

11 Figure 21 is a flow chart of a manual text-to-speech routine.

12 Figure 22 is a diagram of a book menu screen.

13 Figure 23 is a diagram of a page of an electronic book.

14 Figure 24 is a diagram of a page of an electronic book illustrating selected text for
15 conversion to speech.

16 Figure 25 is a flow chart of an automatic text-to-speech routine with an automatic
17 page turn feature.

18 Figure 26 is a flow chart of an automatic text-to-speech routine with a manual
19 page turn feature.

20 Figure 27 is a flow chart of a settings routine.

21 Figure 28 is a diagram of a settings menu.

22 Figure 29 is a flow chart of a dictation routine.

23 Figure 30a is a diagram of a page of an electronic book with transcribed text.

24 Figure 30b is a diagram of a page of an electronic book with a section for
25 presenting transcribed text.

26 Figure 31 is a flow chart of a view book routine.

27 Figure 32 is a diagram of a view book screen.

28 Figure 33 is a flow chart of a voice commands routine.

1 Figure 34 is a flow chart of a voice security routine.

2 Detailed Description

3 An electronic book selection and delivery system is a new way to distribute
4 electronic books to bookstores, public libraries, schools and consumers. The
5 technological breakthroughs of this invention provide a secure system for both delivering
6 selected electronic books and receiving payments. The system has an unusual
7 combination of features that provides the consumer with an electronic book unit that has
8 a high tech aura while being very practical, portable, and easy to use.

9 The clear advantage of the system is that it eliminates the distribution of any
10 physical object such as a paper book or computer memory device from any book or text
11 distribution system. The purchase of an electronic book may become a PAY-PER-
12 READ™ event avoiding the overhead, "middle-men," printing costs, and time delay
13 associated with the current book distribution system. Published material and text such
14 as the President's speech, a new law, a court decision on abortion, or O.J. Simpson's
15 testimony can be made immediately available to the consumer at a nominal fee.

16 The system is a novel combination of new technology involving the television,
17 cable, telephone, and computer industries. It uses high bandwidth data transmissions,
18 strong security measures, sophisticated digital switching, high resolution visual displays,
19 novel controls, and user friendly interface software.

20 The primary components of the text delivery system are the subsystem for placing
21 the text onto a signal path and the subsystem for receiving and selecting text that was
22 placed on the signal path. A preferred embodiment of the system includes additional
23 components and optional features that enhance the system. The system may be
24 configured for use by bookstores, public libraries, schools and consumers.

25 The system for consumer use is made up of four subsystems, namely: (1) an
26 operations center, (2) a distribution system, (3) a home subsystem including reception,
27 selection, viewing, transacting and transmission capabilities, and (4) a billing and
28 collection system.

1 The operations center performs several primary functions: manipulating text data
2 (including receiving, formatting and storing of text data), security encoding of text,
3 cataloging of books, providing a messaging center capability, and performing uplink
4 functions. The system delivers the text from the operations center to consumer homes
5 by inserting text data into an appropriate signal path. The insertion of text is generally
6 performed with an encoder at an uplink site that is within or near the operations center.
7 If the signal path is a video signal path, the system can use several lines of the Vertical
8 Blanking Interval (VBI), all the lines of the analog video signal, a digital video signal or
9 unused portions of bandwidth to transmit text data. Using the VBI delivery method, the
10 top ten or twenty book titles may be transmitted with video during normal programming
11 utilizing existing cable, satellite, wireless or broadcast transmission capability without
12 disruption to the subscriber's video reception. Using the entire video signal, thousands
13 of books may be transmitted within just one hour of air time. Nearly any analog or digital
14 video distribution system may be used to deliver the video signal with included text.

15 The text data may also be transmitted over other low and high speed signal paths
16 including a telephone network (e.g., a public switched telephone network) having a high
17 speed connection such as an asynchronous digital subscriber line (ADSL) connection.
18 Alternatively, other delivery systems may be used, such as those disclosed in the related
19 applications identified above.

20 The home subsystem performs four primary functions: connecting to the video
21 distribution system, selecting text, storing text, and transacting through a phone or cable
22 communicating mechanism. The components of the home subsystem may be configured
23 in a variety of hardware configurations. Each function may be performed by a separate
24 component, the components may be integrated, or the capability of existing cable set top
25 converter boxes, personal computers, and televisions may be utilized. Preferably, a
26 connector, library unit and an electronic book unit, or viewer unit, are used. The
27 connector portion of the home subsystem receives the analog video signal and strips or
28 extracts the text from the video. The home library stores the text signal, provides a user

friendly software interface to the system and processes the transactions at the consumer home. The viewer provides a screen for viewing text or menus and novel user friendly controls. The viewer may also incorporate all the functionality of the home subsystem.

The viewing device is preferably a portable book shaped viewer which stores one or more electronic books for viewing and provides a screen for interacting with the home library unit. A high resolution LCD display is used to both read the books and to interact with the home library software. An optional phone connector or return-path cable connection initiates the telephone calls and, with the aid of the library, transmits the necessary data to complete the ordering and billing portion of the consumer transaction. The user friendly controls include a bookmark, current book and page turn button. The billing and collection system performs transaction management, authorizations, collections and publisher payments automatically utilizing the telephone system. Alternatively, other ordering methods may be used, such as those disclosed in the related applications identified above.

In one embodiment, the primary components of the electronic book selection and delivery system 200 are an encoder 204, a video distribution system 208, a connector 212, and a text selector 216 as shown in Figure 1. The encoder 204 places textual data on a video signal to form a composite video signal. Although the composite signal may contain only textual data, it usually carries both video and textual data. A variety of equipment and methods may be used to encode text data onto a video signal. The video distribution system 208 distributes the composite video signal from the single point of the encoder 204 to multiple locations which have connectors 212. The connector 212 receives the digital or analog video signal from the video distribution system 208 and separates, strips or extracts the text data from the composite video signal. If necessary, the extracted text data is converted into a digital bit stream. Text selector 216 works in connection with the connector 212 to select text.

Using a connector 212 and text selector 216 combination, various methods of selecting and retrieving desired text from a composite or video signal are possible. Text

1 may be preselected, selected as received or selected after being received and stored. A
2 preferred method is for the connector 212 to strip or extract all the text from the video
3 signal and have the text selector 216 screen all the text as received from the connector
4 212. The text selector 216 only stores text in long term or permanent memory if the text
5 passes a screening process described below.

6 An overview of the electronic book selection and delivery system 200 is shown
7 in Figure 2. The delivery system 200 includes: an operations center 250 including an
8 uplink site 254, a video distribution system 208, a home system 258 including a video
9 connector 212, a library 262, a viewer 266, and a phone connector 270, telephone system
10 274, an internet web site 279 and a billing and collection system 278. Also as shown in
11 Figure 2, the home system 258 may include connections to a television 259 and a
12 personal computer 261. The television 259 and the personal computer 261 may be used
13 to display menu screens, electronic books, electronic files, or any other information
14 associated with the delivery system 200. In addition, the television 259 and the personal
15 computer 261 may provide control function that replicate and supplement those of the
16 viewer 266.

17 The operations center 250 receives textual material from outside sources 282 such
18 as publishers, newspapers, and on-line services. Alternately, the outside sources may
19 maintain electronic books at the Internet web site 279. The outside sources 282 may
20 convert textual and graphical material to digital format, or may contract with another
21 vendor to provide this service. The operations center 250 may receive the textual and
22 graphical material in various digital formats and may convert the textual material to a
23 standard compressed format for storage. In so doing, the operations center 250 may
24 create a pool of textual material that is available to be delivered to the home system 258.
25 The textual material may be grouped by books or titles for easy access.

26 As used herein, "book" means textual or graphical information such as contained
27 in any novels, encyclopedias, articles, magazines or manuals. The term "title" may
28 represent the actual title assigned by an author to a book, or any other designation

1 indicating a particular group, portion, or category of textual information. The title may
2 refer to a series of related textual information, a grouping of textual information, or a
3 portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading
4 Books (Ages 10-12)", "Encyclopedia 'BRITANNICA'™", "President's Speech",
5 "Instruction Manual", "Schedule of 4th of July Events", "Pet Handbooks", "Roe v.
6 Wade", and "The Joy of Cooking" are suitable titles. Also, the title may be a graphical
7 symbol or icon. Thus, a picture of a wrench may be a title for a repair book, a picture of
8 a computer a title for a computer book, a graphical symbol of a telephone a title for a
9 telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and
10 ball a title for a sports book and a picture of tickertape a title for a business book. The
11 term "electronic book" refers to the electronic counterpart to a "book."

12 The operations center 250 includes an uplink site 254 for placing the text onto a
13 video signal and sending the composite video signal into a video distribution system. The
14 uplink site 254 would generally include an encoder 204 (not shown in Figure 2) to encode
15 the text onto a video signal.

16 Many analog and digital distribution systems 208, or other telecommunications
17 systems, can be used with the delivery system 200, such as a cable television distribution
18 system, a broadcast television distribution system, video distributed over telephone
19 systems, distribution from the Internet, direct satellite broadcast distribution systems, and
20 other wired and wireless distribution systems.

21 The home system 258 performs five primary functions: (1) connecting with a
22 video distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5)
23 handling transactions. An important optional function of the home sub-system 258 is
24 communicating using a telephone communication system 274. The home system 258 is
25 made up of primarily four parts: a video connector 212 or similar type of connector for
26 connecting with the video distribution system 208, a library unit 262 for storing and
27 processing, an electronic book, or viewer unit, 266 for viewing menus and text and a
28 telephone connector 270 for connecting with a telephone communications system 274.

1 In an alternate arrangement, the viewer 266 may include all the functionality of the home
2 system 258.

3 The billing and collection system 278 may be co-located with the operations
4 center 250 or located remote from the operations center 250. In one embodiment, the
5 billing and collection system 278 is in communication with the home system 258 via
6 telephone-type communication systems (for example 274). Any of a number of telephone
7 type communication systems, such as, a cellular system, will operate with the billing and
8 collection system 278. The billing and collection system 278 records the electronic books
9 or portions of text that are selected or ordered by the subscriber. The collection system
10 will charge a subscriber's credit account or bill the subscriber. In addition, the billing and
11 collection system 278 will monitor that amount due to publishers or other outside sources
12 282 who have provided textual data or other services such as air time to enable the text
13 delivery system 200 to operate.

14 When electronic books are provided via the Internet web site 279, the billing and
15 collecting functions may be incorporated into the Internet web site 279. For example, a
16 subscriber may pay for an electronic book selection by entering a credit card number into
17 a data field of a page of the Internet web site 279. In this configuration, a separate billing
18 and collection system may not be required.

19 Figure 3a is an expanded overview of a delivery plan 301 for the delivery system
20 200. The delivery plan 301 supports various types of subscribers and various billing
21 systems. Figure 3a shows that publishers 282 will provide text transfer 302 to the
22 operations center 250' and receive payments 306 from the billing and collection system
23 278'. A separate channel uplink site 254' is shown in this configuration receiving data
24 310 from the operations center 250'. The operations center 250' has three separate
25 sections (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for
26 security encoding 322 and a third section for catalog and messaging center functions 326.

27 The billing and collection system 278' shown has two sections (330, 334) one for
28 transaction management, authorizations and publisher payments 330, and the other for

1 customer service 334. The customer service section 334 provides for data entry and
2 access to customer account information. Transaction accounting information 338 is
3 supplied to credit card companies 342 by the transaction management section 330 of the
4 billing and collection system 278'. The credit card companies 342 provide billing 346 to
5 customers either electronically or by mail.

6 Three methods for communicating between the subscriber base 348 and the
7 billing and collection system 278' are shown: by telephone switching 350 alone, cellular
8 switching 354 and telephone switching 350 combined, and by use of the cable system 358
9 and the telephone switching 350. The system shown supports both one-way 362 and two-
10 way cable communication 366 with subscribers. Public libraries and schools 370 as well
11 as bookstores 374 may use the delivery system 301.

12 Public libraries and schools 370 would have a modified system to allow the
13 viewer 266 to be checked-out or borrowed while bookstores 374 would rent or sell the
14 viewer 266 and sell the electronic books. The bookstores 374 as well as the public
15 libraries and schools 370 may be serviced by cable 378. Optional direct broadcast
16 systems (DBS) 382 can also be used with the delivery system 200. The DBS 382 may
17 provide the electronic books using digital satellite technology, with the electronic books
18 being received via a backyard satellite antenna, for example.

19 Figure 3b is an alternate delivery plan 301' that provides for electronic book
20 selection and delivery using the Internet. In Figure 3b, the publishers 282 provide the
21 electronic books to be posted at the Internet web site 279. The publishers may convert
22 the text and graphical data to digital format, compress the digital data, and upload the
23 compressed digital data to the Internet web site 279. Alternately, the publishers 282 may
24 arrange for an outside conversion activity 283 to convert the text and graphical data to
25 digital format. The conversion activity 283 may then provide the digital data to the
26 Internet web site 279. For example, a large on-line bookstore could gather publications
27 in electronic form from a variety of publishers, or could convert hard-copy books to

1 electronic form, and post the electronic books on the Internet such as at the Internet web
2 site 279.

3 The electronic books may then be transferred via a public switched telephone
4 network (PSTN), for example, direct to a subscriber 285, a library 286 and a bookstore
5 287. The library 286 and the bookstore 287 may also provide electronic books to the
6 subscriber 285.

7 I. The Operations Center

8 Figure 4 is a schematic of an operations center 250 which includes an uplink 254.
9 The operations center 250 gathers text or books by receiving, formatting, storing, and
10 encoding. A data stream 302 containing text is received at the operations center 250 by
11 a data receiver 402. The data receiver 402 is under the control of a processor 404. After
12 reception, the data stream is formatted using digital logic for formatting 406 which is also
13 under the control of the processor 404. If any additional text is being generated at the
14 operation center 250 locally for insertion into the distributed signal, the text generation
15 is handled through text generator hardware 410 which may include a data receiver and
16 a keyboard (not shown). Following processing by the text generator 410, the additional
17 text can be added to the text received by the combining hardware 414 that includes digital
18 logic circuitry (not shown).

19 The processing at the operations center 250 is controlled by a processor 404
20 which uses an instruction memory 416. The processor 404 and instruction memory 416
21 may be supplied by a personal computer or mini-computer. To perform the catalog and
22 messaging functions, the operations center 250 uses a catalog and message memory 420
23 and the text generator 410 if necessary.

24 The data stream of text, catalog and messages is preferably encoded by security
25 module encoding 424 prior to being sent to the uplink module 254. Various encoding
26 techniques may be used by the security encoding module 424 such as the commercial
27 derivative of NSA's encryption algorithm (Data Encryption System (DES)) and General
28 Instrument's DigiCipher II. Following encoding, the encoded text may be stored in text

1 memory 428 prior to being sent to the uplink 254. A first-in-first-out text memory
2 arrangement may be used under the control of the processor 404. Various types of
3 memory may be used for the text memory 428 including RAM. The operations center
4 250 may use file server technology for the text memory 428 to catalog and spool
5 electronic books for transmission as is described below.

6 To transmit textual data (i.e., electronic books), the delivery system 208 uses high
7 bandwidth transmission techniques such as those defined by the North American
8 Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard.
9 Using the WST format (where each line of the Vertical Blanking Interval contains 266
10 data bits), a four hundred page book, for example, may be transmitted during
11 programming using four lines of the Vertical Blanking Interval at a rate of approximately
12 one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may
13 be transmitted over a dedicated channel, which interrupts programming so that 246 lines
14 of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per
15 second). A teletext type format is the simplest but possibly the slowest text format to use
16 with the delivery system 200. In either event, an encoder 204 is utilized at an uplink site
17 254 to insert textual data into the analog video signal. In many other respects, the
18 delivery of the textual information is completed using existing cable television plant and
19 equipment.

20 Figure 5a is a flowchart of the steps involved in processing text from the publisher
21 or provider 282 that occurs at the operations center 250. As shown in block 500, the
22 publisher 282 processes data files of text for books, compresses, encrypts and sends the
23 data files to the operations center 250 or uplink 254. Text files for books are preferably
24 sent one book at a time. As shown in block 504, the uplink 254 or operations center 250
25 receives and processes the data stream from the publisher 282. Generally, part of this
26 processing includes encryption and error correction.

27 As shown in block 508, files are broken into smaller packets of information.
28 Header information is added to the packets. The bit stream is converted from a serial

1 digital bit stream to an analog bit stream that is compatible with an NTSC video signal.
2 Block 512 shows the switching of analog data into the video lines of a video signal. The
3 analog data is generally placed either in the VBI or the active video lines. In some
4 instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40
5 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

6 Figure 5b is an example of a hardware configuration to perform some of the
7 functions for blocks 508 and 512. A video feed 516 is received and processed through
8 a sync stripper 520. The stripped sync signal 532 is used by the digital logic control 524.
9 The digital logic control 524 receives the sync signal 532 and a serial digital bit stream
10 528 for processing. The digital logic control 524 passes the serial digital bit stream to the
11 Digital to Analog converter 536 and outputs a control signal 540 for the video switch
12 544. The video switch 544 integrates the video feed 516 and analog data stream 548 into
13 a video feed with analog data signal inserted 552.

14 As an alternative to cable, satellite, broadcast, or other television delivery
15 methods, the public telephone system may be used to transmit books to the subscribers.
16 An average electronic book would take about 7 minutes to transmit over the public
17 telephone system. Using the telephone system, it is not necessary to combine video and
18 text into a composite signal. In most other respects, the operation center would remain
19 similar whether text delivery was by telephone or cable. File server technology (such as
20 that described in U.S. Patent No. 5,262,875, entitled **AUDIO/VIDEO FILE SERVER**
21 **INCLUDING DECOMPRESSION/PLAYBACK MEANS**, issued to Mincer, et al., and,
22 U.S. Patent No. 5,218,695, entitled **FILE SERVER SYSTEM HAVING HIGH-SPEED**
23 **WRITE EXECUTION**, issued to Noveck, et al., incorporated herein by reference) may
24 be used at the operation center with a telephone system text delivery method.

25 As another alternative to cable, television, and telephone system delivery, the
26 public telephone system may be used to provide access to the Internet, where the Internet
27 web site 279 may be accessed. Electronic books may be ordered, paid for, and delivered
28 directly from the Internet web site 279 over the telephone system.

1 In any delivery system using the telephone system, individual subscribers may
2 increase the electronic book deliver rate by incorporating high speed modems or other
3 communication devices such as an Integrated Services Digital Network (ISDN)
4 connector, or by use of an Asymmetric Digital Subscriber Line (ADSL)

5 II. The Home System

6 The hardware configuration for a four component home system 258 is shown in
7 Figure 6a. Figure 6b shows a hardware configuration for a two component home system.
8 The hardware components may also be incorporated into a single unit that communicates
9 with a terminal in a television delivery system or with a telephone system by use of a
10 modem, for example. The home system 258 performs several functions, such as
11 receiving data and video transmissions, stripping (or extracting) the data from the video
12 signal, screening and storing the data, providing user friendly interface controls and
13 software, displaying menus and text, processing transactions, initiating telephone calls
14 and transmitting billing data. Various hardware configurations may be utilized to achieve
15 the desired functions of the home system 258. For example, as shown in Figure 6b, the
16 home system 258 can be configured to utilize the reception and channel tuning capability
17 of the current installed subscriber base of cable converter boxes and televisions 601. The
18 home system 258 can also be designed as an advanced set top terminal converter box
19 with menu generation capability, electronic memory and a telephone modem as described
20 in section V below.

21 The electronic components which make up the home system 258 can be arranged
22 in a variety of ways. In the four unit system of Figure 6a the viewer 266 and library unit
23 262 are wired together while the remaining components communicate through RF
24 transceivers 604. In a simple version of the home system 258 there are only two units,
25 the library unit 262 and a viewer 266. Figure 6b shows a two unit home system 258 with
26 certain optional features. Finally, all the functionality of the home system 258 may be
27 incorporated into one electronic book unit, or viewer.

1 The viewer 266 is generally equipped with a high resolution viewing area 602,
2 digital logic (including a key 605, security 606, and a microprocessor 621), video
3 graphics control and memory 607, power supply circuitry 602 (not shown), an optional
4 battery 603 and an optional RF transceiver 604. In a two unit arrangement, the library
5 unit 262 contains the connector function to the video distribution system 208, connector
6 function to a public telephone communications system, and memory 600 (which may be
7 removable and portable 600'). More specifically, the library unit 262 would include data
8 stripping functions 617, digital logic 609, memory storage 600, power circuitry 610,
9 optional telephone connections 611 (including cellular or PCN 611'), optional battery (not
10 shown), optional tuner module 613 and an optional RF transceiver 604. The video
11 connector 212 and the public telephone system connection 270, as well as the removable
12 portable memory unit 600 of the library unit 262 may be broken out into separate
13 components. (Figure 6b shows a removable portable hard disk memory 600' with
14 removable cartridges 614.) Finally, the home system 258 may include an attached
15 keyboard 267 or a wireless keyboard 268. Both the attached keyboard 267 and the
16 wireless keyboard 268 may be used to communicate with the viewer 266 (not shown) or
17 the library unit 262.

18 The wireless keyboard 268 may communicate via radio frequency (RF) signaling,
19 for example. Therefore, the home system 258 may have as many as six separate
20 components which communicate with each other. The two, three, four, five or six
21 separate components which make up the home system 258 can communicate with each
22 other in a variety of ways, including hardwired connection 615, RF transceiver 604, and
23 other wireless methods.

24 RF communications are preferred in the home because they allow separate
25 components to be located throughout the home without restriction. The data
26 communicated between the units is preferably secure data. In addition, the library unit
27 262 may provide power to the viewer 266 through the hardwired connection 615.

1 Alternatively, a single unit may perform all of the home system 258 functions.
2 The single unit should use light-weight materials, including a light-weight battery. A
3 single unit eliminates the need to communicate (externally) between units. The single
4 unit is less expensive and eliminates duplicative processing, memory storage and power
5 circuitry.

6 To receive and strip the data from the video signal at the consumer's home, either
7 a cable interface device or cable connector 212 is used. The cable connector device
8 includes a tuner 613, while the cable interface device makes use of existing tuning
9 equipment in the home. In either configuration, data is stripped from the video signal
10 and stored at the subscriber's location in the library unit 262. The phone connector 270,
11 and modem 611 initiate telephone calls and transmit ordering and billing information to
12 the operations center 250 or billing and collection system 278. Alternatively, the phone
13 connecter 270 and the modem 611 may be used to provide access to the Internet to order
14 and receive electronic books from an Internet web site. A digital connector 619 is
15 provided to communicate digital information with the set top 601. The library unit 262
16 is the intelligent component of the home system, incorporating the hardware and software
17 necessary to store the text data, generate menus and effect the purchase transactions. In
18 addition to an RF transceiver 604, the library unit 262 also includes the necessary jacks
19 and connections to allow the delivery system 200 to be connected to the viewer 266. As
20 shown in Figure 6b, the library 262 communicates the text data (electronic book) to the
21 viewer 266 in a secure format which requires a key 605 for decryption. The text is
22 generally only decrypted page by page just before viewing.

23 a. The Video Connector

24 Figure 7 shows the flow of the processes performed by the video connector 212.
25 The video connector receives the video signal 608, tunes to the channel containing the
26 text data 612, strips the text data from the video signal 616, and communicates the text
27 data stream to logic components in the library 620.

1 The connection to the video distribution system is preferably a cable connector
2 to a cable television delivery system, as shown in Figure 6b. The cable connector
3 includes a data stripper circuit 617, which accepts video input from either a set top
4 converter, TV or VCR 601, or an optional tuner block 613 that receives the CATV signal
5 through the cable connector 212'. The data stripper circuit 617 strips data out of the
6 video, and outputs a digital bit stream to the digital logic portion 609 of the library unit
7 262. The data is embedded in the video signal either in the vertical blanking interval or
8 the active video portion in an encrypted and compressed format. The data stripper circuit
9 617 can be placed inside the set top converter box 601, TV, or in the library unit. The
10 data stripper circuit 617 outputs the digital bit stream to be used by the library digital
11 logic 609.

12 The video connector 212 may also contain a channel tuner module 613 that can
13 tune to the video channel and provide access to the video that contains the data to be
14 stripped. Using the optional tuner module 613, a set top converter, VCR, or TV tuner is
15 not needed in the home system. The optional tuner module 613 would instead receive
16 the CATV signal directly through the cable connector 212.

17 b. Library

18 An embodiment of the library unit 262 for a two unit home system 258 is shown
19 in both Figure 6b and Figure 8. The embodiment shown includes the following optional
20 parts: the video connector 212, phone connector 270, RF transceiver 604, and battery
21 pack 624 in addition to a removal portable memory 600', microprocessor 628, instruction
22 memory unit 632, digital logic 636, and power unit 640.

23 The library unit 262 contains a digital logic section 609 (not shown in Figure 8)
24 which includes the microprocessor 628, the digital logic 636 and the instruction memory
25 unit 632. The microprocessor 628 is preferably a secure microprocessor such as the Mot
26 SC21 device sold by Motorola. The digital logic section 609 will receive the serial digital
27 bit stream from the data stripper circuit 617 and process the data. Error correction will
28 also be performed by the digital logic section 609 and the data will be checked for proper

1 address. If the address of the data is correct and the library unit 262 is authorized to
2 receive the data, the data will be transferred to the memory storage unit 600, 600'.
3 Authorization to receive the data is provided by the cable headend or another distribution
4 point. An authorization code may be sent in the serial digital bit stream. The digital logic
5 section 609 will send appropriate text and graphical data to the memory storage unit 600,
6 600'. It transfers this data in a compressed and encrypted format and the data remains
7 stored in a compressed and encrypted format.

8 i. Memory Storage Unit

9 The memory storage unit of the library may be a removable portable memory unit
10 600' (as shown in Figures 6a, 6b and 8). A variety of options are available for memory
11 storage: a hard disk drive, a hard disk with removable platters, and a CD ROM or
12 memory stick. Referring to Figure 6b, a hard disk drive unit 600' which contains
13 removable platters may also be used. This would provide virtually unlimited library
14 storage capacity. Data (i.e., electronic book files) may be stored in the memory storage
15 unit in a compressed and encrypted format. As is also shown in Figure 6b, the data may
16 also contain a key or unique ID number that matches the ID or key of the viewer 266.
17 This matching of a unique key or ID number prevents unauthorized transfer of text data
18 from the memory storage unit to an unauthorized viewer. Small memory devices such
19 as smart cards, electronic memory cards or PCMCIA cards or memory sticks (personal
20 computer memory card industry association) may also be used to store the data.

21 ii. Power Circuitry

22 As shown in figures 6b and 8, the library unit 262 may accept power from either
23 AC wall power 610, DC power 640, or optional battery power 624. The power circuitry
24 610, 640 may provide all the voltage necessary from either the battery 624 or AC unit for
25 the various circuitry in the library. The power circuitry 610, 640 may also provide power
26 to the viewer 266 through a single data cable when connected to the viewer. The power
27 circuitry 610, 640 will recharge the battery using AC power when in operation. With the
28 optional battery unit 624 installed, the library unit 262 becomes a portable unit and can

1 still provide power to the viewer 266. In order to extend battery life, power conservation
2 measures may be utilized, such as shutting down the memory system when not in use.
3 When the viewer 266 is being utilized and the library circuitry is not being utilized,
4 virtually all power may be shut down to the library unit 262.

5 iii. Connection to the Public Telephone System

6 The connection to the telephone system may be provided by a modem 611.
7 Various available modems may be used to perform this function. As shown in Figure 6b,
8 cellular phone or PCN phone connections 611' may also be provided. When the home
9 system 258 is first initialized, the modem may be used to transfer the name and credit
10 card information of the consumer to the billing and collection system 278. The telephone
11 connection 270 may be utilized each time an electronic book is purchased by a consumer
12 to complete and record the transaction. The telephone connection 270 may also be used
13 as a means for receiving the electronic books from the operations center 250 or from an
14 Internet web site, by-passing the video distribution system 208. The phone connection
15 270 may be a separate unit as shown in Figure 6b.

16 iv. Library Processing

17 Figure 9 shows an example of some basic processing performed by the library unit
18 262 on the data stream 651 received from the video connector 212 or stripper circuit 617.
19 First the data stream 651 is checked for error correction by block 650. If an error is
20 detected, block 654 de-interleaves the data followed by block 658 running a FEC
21 (Forward Error Correcting) algorithm. The combination of block 650, 654 and 658
22 perform the error correction needed on the data stream. If no error correction is necessary
23 the data proceeds to block 662 where packets are individually checked for packet address.

24 If the address is a unique address, block 666 checks whether the address of the
25 packet matches the library box ID number. The library box ID number is a unique
26 number associated with that library unit 262 which is used to ensure security of the data.
27 Block 670 determines whether an electronic file has already been opened into which the
28 data packet can be saved. If no data file has been opened then block 674 opens a new

1 data file for that packet. If an electronic file has been opened, then the packet is saved
2 in that electronic file on disk, block 678. Next, the process checks to see if this is the last
3 packet for a particular book for a particular textual data block being received 682. If it
4 is the last packet of information, then the electronic file is closed and the directory of
5 available electronic files is updated 686. Following either block 682 or 686, the process
6 returns to receive another data packet from the data stream received from the data stripper
7 block.

8 If the packet address is checked and the address is determined to be a broadcast
9 address, the process determines the type of message that is being sent 690. The message
10 may be an index of book titles, menu (and menu graphics) information, announcements,
11 special offerings, discounts, promotions, previews etc. The message is then stored in
12 appropriate electronic message file 694 and the process is returned to block 650 to receive
13 another data packet and perform another error check.

14 Using the process of Figure 9, the library unit 262 is able to receive, store and
15 update directories related to the textual data and graphical data (that can be used to depict
16 pictures in a given book or to generate menus). Variations of the processes are possible
17 depending on the format of the data and operating system of the library unit 262.

18 Figure 10 shows an example of the processing of information requests from the
19 viewer 266 at the library unit 262. Information requests from the viewer 266 are received
20 either through the cable connecting the viewer 266 to the library unit 262 or through
21 wireless transmissions such as RF. It is possible in some embodiments for subscribers'
22 requests to come from a set top converter box 602 (see Section V).

23 Information requests received from the viewer 266 generally fall into three
24 categories: (1) directory data of electronic books stored in the library unit 262, (2) index
25 of all available electronic books on the system, and (3) requests for a specific electronic
26 book (Block 700). A get directory process 704 answers a request from the viewer 266
27 for a directory of data showing the electronic books stored at the viewer 266. The
28 directory of data is sent to the viewer 266 so that it may be displayed to the subscriber.

1 A get index process 708 handles requests from the viewer 266 for an index of all
2 available electronic books on the home system 258. The library unit 262 will obtain an
3 index of all the available books on the system and transmit that index, process 712, with
4 menu information to the viewer 266. An open file process 716 replies to a request from
5 the viewer 266 for a specific electronic book. The library unit 262 opens an electronic
6 file for the specific electronic book requested by the viewer 266 and transmits the record
7 or transmits the information 720 on a packet-by-packet basis to the viewer 266. This
8 process of transmitting the specific electronic book, record, or packets to the viewer 266
9 continues until the last record or packet has been sent, 724.

10 In addition to the processes shown on Figure 10 in handling a request for a
11 specific electronic book, the library unit 262 also orders and receives specific electronic
12 books from the operations center 250 using the process as described in the open file
13 process 716. Following a request for a specific electronic book which is not stored at the
14 library unit 262, the library unit 262 will proceed to determine the next available time the
15 electronic book will be on the video distribution system 208 and ensure reception and
16 storage of that electronic book (process not shown). In performing this process the
17 library unit 262 will transmit to the viewer 266 information on when it will obtain the text
18 data for the electronic book so that the subscriber may view the electronic book. In
19 addition to timing information, price and other ordering information may also be passed
20 by the library unit 262 to the subscriber.

21 c. The Viewer

22 Figure 11 is a block diagram of the viewer 266 showing its internal components.
23 The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The
24 viewer 266 is designed to physically resemble a bound book. The viewer 266 is made
25 up of several primary components and several optional components: (1) LCD display
26 602, (2) digital circuitry (not shown), (3) video graphics controller 607', (4) controls 740,
27 (5) book memory 728, (6) optional power supply circuitry 736, (7) optional battery 603',

1 (8) optional RF transceiver 604, (9) optional cellular or mobile communicator (608), (10)
2 optional keyboards 267 and 268,(11) a speaker 633, and (12) a microphone 634.

3 (1) A high resolution LCD screen 602, preferably of VGA quality, is used by
4 the viewer 266 to display text and graphic images. The screen is preferably the size of
5 one page of a book. A two page screen or two screens may also be used with the viewer
6 266.

7 (2) Digital circuitry that includes a secure microprocessor 621, instruction
8 memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and
9 encrypted format. The secure microprocessor 621 compares the ID number of the viewer
10 266 with the incoming data stream and only stores the text data if the ID number of the
11 viewer 266 matches that within the incoming data stream. It is preferred that the viewer
12 266 not output text data or other data and that the data is decompressed and decrypted
13 only at the moment of viewing and only for the current page being viewed. These
14 measures are preferred because they provide additional security against unauthorized
15 access to data.

16 (3) A video graphics controller 607' that is capable of assisting and displaying
17 VGA quality text and graphic images is included in the viewer 266. The graphics
18 controller 607' is controlled by the digital circuitry described above. Text may be
19 displayed in multiple font sizes.

20 (4) The viewer 266 of Figure 11 has touch panel controls 740. These unique
21 and novel controls 740 allow the consumer to select stored electronic books and
22 electronic books from catalogues, move a cursor, and turn pages in a book. Typically,
23 preferred controls 740 include forward and reverse page buttons 742, 741, a ball (or
24 trackball) 743 for cursor movement, one or more selection buttons 745, a current book
25 button 747 and a bookmark button 749 (see Figure 14a).

26 The controls 740 should be easy to use and conveniently located. Referring to
27 Figure 14a, the controls for the viewer 266 may be located below the screen 602 at the
28 bottom portion of the viewer 266. The next page turn button 742 is the most used button

1 740 and may be located towards the right edge of the page. The subscriber is likely to use
2 right hand thumb movements to work the controls particularly the page turn buttons 741,
3 742. Therefore, it is preferred that the buttons be arranged in such a manner that the
4 buttons are easily controlled by a subscriber's right thumb. Generally, this can be
5 accommodated either on the lower portion of the viewer 266 (as shown) or along the right
6 hand margin of the viewer 266 (not shown). The current book button 747 and bookmark
7 button 749 are usually the least used of the controls 740. Therefore, in the example
8 shown those buttons 747, 749 are located on the inside portion towards the binder of the
9 viewer 266.

10 Locating the ball 743 or other cursor movement device (such as four pointer
11 arrows -- not shown) in the bottom center of the viewer 266 is both easier for the
12 subscriber to use and easier in manufacturing the viewer 266. The selection buttons for
13 the cursor 745 are preferably located below the middle diameter of the cursor ball 743 on
14 the right and left sides of the ball as shown. If pointer arrows are used for cursor
15 movement, a selection button 745 may be located in the center of the four arrow buttons
16 (not shown). Again, the most used controls should be located where a subscriber's right
17 hand thumb would normally rest.

18 (5) Book memory 728 for at least one electronic book or more of text is included
19 in the viewer 266. The memory 728 stores text and any graphics which represent pictures
20 in a book. The memory 728 can also store menu graphics data. Two different memory
21 728 devices may be used in the viewer 266, one for the instructions for the
22 microprocessor 621 in the digital circuitry and a second type of memory may be used for
23 the book memory 728 (and graphics). Various memory devices available on the market
24 may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires
25 approximately 0.6 megabytes of storage, a small hard disk providing approximately 60
26 MBytes of storage provides memory to store approximately 100 electronic books. The
27 large hard disk drives currently available allow for storage of thousands of electronic
28 books.

1 Text for books may be displayed in various font sizes. To accommodate various
2 fonts for display, a variety of fonts are stored in instruction 732 or book memory 728.
3 Thus larger or smaller fonts may be recalled from memory 621, 728 to create displays
4 desired by the subscriber.

5 (6) Power supply circuitry 736 in the viewer 266 will accept power from
6 either an AC power source or from an optional battery 603', or the library unit 262. The
7 power supply circuitry 736 provides the necessary voltages to accommodate the various
8 systems within the viewer 266.

9 (7) An optional battery 603' is provided in a preferred embodiment. The
10 battery 603' is automatically recharged when AC power is available.

11 (8) An optional RF transceiver 604 which provided two-way data link
12 between the viewer 266 and other components of the home system can also be included
13 in the viewer 266.

14 (9) Also, the viewer 266 may include a cellular transceiver for mobile
15 communications.

16 (10) The optional wired (attached) keyboard 267 and wireless (e.g., RF)
17 keyboard 268 (see Figure 6a) may be used with the viewer 266 to provide
18 communications between the subscriber and the viewer 266.

19 (11) and (12) The speaker 633 and the microphone 634 allow the viewer 266 to
20 provide audio signals to the subscriber, and allow the subscriber to provide an audio
21 input. The speaker 633 and the microphone 634 may be used in conjunction with the
22 cellular transceiver 608 or other telecommunications equipment to provide for reception
23 and transmission of telephony and data.

24 The viewer 266 of Figure 11 has parts available for providing connections to: a
25 library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit
26 756 (such as that shown in Figure 6b 600'). Various electronic memory cards such as
27 PCMCIA can be used with this viewer 266.

1 Security, low power consumption and excellent display technology are desired
2 features of the viewer 266 design. The viewer 266 should be lightweight and portable.
3 The viewer 266 contains a software operating system that allows electronic books to be
4 stored, read and erased and includes the capability to order electronic books and retain
5 them in memory 728 for a predefined period of time determined by the system operator.
6 The software can be configured to allow the electronic book to be read during a period
7 of time (i.e., two weeks) and then automatically erased, read once and erased, or held in
8 memory permanently. Each viewer 266 has a unique key 605. All of the data storage is
9 encrypted with the key 605 for an individual viewer 266 to prevent more than one viewer
10 266 accessing the text file or electronic book file.

11 Figure 12 is a flow diagram of some of the processes executed by the viewer 266.
12 Generally, the viewer 266 receives inputs from the subscriber through touch panel
13 controls 740. Alternately, the viewer 266 receives inputs from a touchscreen display, the
14 attached keyboard 267, or the remote keyboard 268. The subscriber's information
15 requests are then processed through an information request process 800 by the viewer
16 266.

17 If the subscriber requests a menu of available electronic books, a select available
18 book process 804 will select a book menu. An open file process 808 will open the
19 electronic files which list the electronic books that are available (related to the category
20 of topic of the menu) and display the menu with the names of the available electronic
21 books.

22 If the subscriber selects a particular electronic book to read, then a select a book
23 process 812 will process the selection and determine the electronic file that contains the
24 specific electronic book. An open file process 816 will open the file for that specific
25 book and normally access the first page. (If a pointer has already been set in that
26 electronic book's file, the process may default to that page.) A decision process 820 will
27 then determine which page needs to be displayed. The decision process 820 will
28 determine whether a next page, previous page or a book marked page needs to be

1 displayed. If the pointer for the electronic file is not in the correct location then a get
2 previous page process 828 will move the pointer and obtain the previous page of data
3 from the stored file. Otherwise, a get next page process 824 will normally obtain the next
4 page of text from the stored electronic file. A decrypt and decompress process 832 will
5 decrypt and decompress the text data and send the data to the video display. The video
6 display will generally have a video display memory associated with it and the decrypt and
7 decompress process 832 will send the data directly to that video display memory. The
8 circuitry for the display then completes the process of displaying the page of text.

9 If the subscriber, through the controls 740, requests (from the information request
10 process 800) that the power be turned off, then a process, 836, of turning the power off
11 will be initiated. A save pointer process 840 saves the pointer in memory to the page
12 number in the book that the viewer 266 is currently reading. A close files process 844
13 closes all the electronic files and signals the power circuitry to shut down the power to
14 the various circuits in the viewer 266. The subscriber may also use the controls 740 to
15 access other electronic files using electronic links embedded in a particular electronic file.
16 An electronic link system will be described later in detail.

17 With these examples of basic processes the viewer 266 is able to display book
18 selections and display text from those books.

19 d. Menu System

20 Referring generally to Figure 13, the delivery system 200 may have a menu
21 system 851 for selecting features and electronic books from the delivery system 200. The
22 operating software and memory required for the menu system 851 may be located at the
23 viewer 266 (e.g., the instruction memory 732 and/or book memory 728). However, it
24 may also be located at the library unit 262 (e.g., the instruction memory 632) or the
25 library unit 262 and the viewer 266 can share the software and memory needed to operate
26 the menu system 851. Since the menus are usually displayed on the viewer 266 and it is
27 preferred that the viewer 266 be capable of operating in the absence of the library unit

1 262, the basic software and memory to create the menus is more conveniently located at
2 the viewer 266.

3 The menu system 851 allows sequencing between menus and provides menu
4 graphics for graphical displays such as on the LCD display 602 of the viewer 266. In a
5 system which uses a set top converter these menus may also be displayed on a television
6 screen. In the simplest embodiment, the menus provide basic text information from
7 which the subscriber makes choices. In more sophisticated embodiments, the menus
8 provide visual displays with graphics and icons to assist the subscriber.

9 Figure 13 depicts a menu system 851 with sequencing. The primary menus in the
10 system are an introductory menu 850, a main menu 854 and various submenus 858. In
11 the embodiment shown, there are three levels of submenus 858. In certain instances one
12 or two submenus 858 is sufficient to easily direct the subscriber to the selection or
13 information requested. However, there are features in which three or more submenus 858
14 make the user interface more friendly for the subscriber. Each level of submenus 858
15 may consist of multiple possible menus for display. The particular menu displayed
16 depends on the selection by the subscriber on the previous shown menu. An example of
17 this tree sequence of one to many menus are the help submenus 887, 888. Depending
18 upon the specific help requested, a different level two help menu is displayed to the
19 subscriber.

20 An example of an introductory menu 850 is shown on Figure 14a. Generally the
21 introductory menu 850 introduces the viewer 266 to the system and provides initial
22 guidance, announcements and instruction. The introductory menu 850 is followed by a
23 main menu 854, an example of which is shown in Figure 14b. The main menu provides
24 the viewer 266 with the basic selection or features available in the system. Figure 14b
25 is an example of a main menu 854 offering many additional features and submenus 858
26 to the subscriber. For example, Figure 14b shows that the viewer 266 is able to choose
27 by a point and click method, many options including: (1) free previews, (2) books you
28 can order, (3) books in your library, (4) your current book, (5) help, (6) on-line services

1 and (6) other system features. Following a selection on the main menu 854, a
2 corresponding submenu 858 is shown.

3 Figure 13 shows thirteen available primary or first level submenus. They are (1)
4 account set up 862, (2) free previews 866, (3) book suggestion entries 855, (4) books in
5 your library 872, (5) books you can order 878, (6) your current book 884, (7) help 887,
8 (8) available features 890, (9) messages 893, (10) account information 896, (11) outgoing
7 message submenu 898, (12) show links 970, and (13) create links 980. Figure 14c is an
example of a first level submenu for electronic books in your library 872. This "Book In
9 Your Library" example submenu 872 shows six available electronic books by title and
10 author and provides the subscriber with the ability to check a different shelf of books 874
11 or return to the main menu 854. Figures 14d and 14e show example submenus 858 for
12 electronic books that may be ordered using the "Books You Can Order" submenu 878.

13 Figure 14f is an example of an order selection and confirmation menu 880', which
14 provides a "soft keyboard" 975 for the subscriber to use in placing an electronic book
15 order and which confirms the subscriber's order. In this particular example, the
16 subscriber is required to enter a PIN number to complete the subscriber's order. The
17 "soft keyboard" 975 could be configured as a full alpha-numeric keyboard, and may be
18 used by the subscriber to add additional information related to a book order. An alpha-
19 numeric or similar password may be used to ensure the subscriber is an authorized
20 subscriber. In an embodiment, the subscriber confirms an order with a PIN or password
21 and then receives a final confirmation screen. The final confirmation screen is primarily
22 text and may state: Your book order is now being processed via CABLE.

23 Your book will be delivered overnight and your VISA account will be charged
24 \$2.95.

25 Your book will be available for reading at 6:00AM EST tomorrow. Make sure
26 that:

27 1. your Library Unit and Cable Connection Unit are plugged in with
28 aerials up tonight; and

1 2. you tune your cable converter to THE BOOK Channel. The TV set
2 does not have to remain on.
3 or similar language.

4 Examples of the "Account Set Up Menu" 862 and further submenus 858 related
5 to account set up (which provide instructions and account input 864) are shown in
6 Figures 14g and Figure 14h. These submenus 858 allow initialization of an account at
7 the operations center 250 and orders to be charged to credit cards. The submenus 858
8 include the ability to enter data related to your desired PIN number or password, credit
9 cards, phone numbers, etc. It is preferred that the account set up be performed using the
10 telephone system. A confirmation menu verifies that the account has been properly set
11 up with the desired PIN or password and credit card.

12 Free previews for books 866 are also provided by submenus (868, 870).
13 Examples of the free preview menus are shown in Figure 14i and Figure 14j. Figure 14i
14 shows a menu depicting various electronic books for which previews are available for
15 viewing. Following an electronic book selection, a screen submenu showing an excerpt
16 of the selected electronic book cover's description is provided along with an excerpt from
17 a critic's review of the selected electronic book. In a preferred embodiment, this preview
18 screen for a particular electronic book also allows the subscriber to select a submenu
19 which provides information about the author. The book preview submenu may also
20 include a still video picture or graphics portraying a book cover or a scene from the
21 electronic book. An example of such a still video picture or graphics is shown in Figure
22 14j which depicts a preview screen 870 about the author. The video may also be
23 provided according to MPEG standards as a short moving video clip. Such a clip could
24 be an interview with the author, for example. The author's preview screen 870 shows a
25 picture of the author, provides a short biography, and may allow the subscriber to order
26 the author's books. The price for ordering the authors various electronic books may also
27 be shown on the menu. Alternatively, the previews may be provided through an
28 electronic link system, which will be described in detail later.

1 In addition to free previews, in more sophisticated embodiments, the delivery
2 system 200 provides the subscriber with an electronic book suggestion feature (see 855).
3 This is accomplished using the menu system 851 and the processor with associated
4 memory located at the viewer 266, library unit 262 or at the distribution point (1020 or
5 250). When necessary, information for the program suggestion feature is sent in the text
6 data of the composite or video signal to the home system 258. With this feature, books
7 or authors are suggested to a subscriber based upon historical data of the subscriber's
8 previous orders, demographics or mood of the subscriber, other indicators, and/or by text
9 word searches.

10 In a book suggestion embodiment, text word searches of preview information
11 (such as book cover descriptions, critics reviews and biographies about the author) and/or
12 text of books or other titles are performed by the library unit 262 using databases stored
13 in the library memory 600. Personalized book or author suggestions are made to the
14 subscriber by obtaining information from the subscriber indicative of general subscriber
15 interests. Subscriber entries are solicited from the subscriber preferably using the
16 electronic book suggestion entries submenu 855. The system uses these subscriber
17 entries either directly or indirectly to search for books or authors to suggest to the
18 subscriber.

19 Generally, the book suggestion methods may be categorized into two categories,
20 either responsive methods (which respond to a series of subscriber menu entries), or
21 intelligent methods (which analyze data to suggest an electronic book). Using a
22 responsive or intelligent method, the delivery system 200 determines a list of suggested
23 titles or authors and creates a second or third level submenu 856, 857 to suggest the titles
24 for subscriber selection.

25 Responsive methods of suggesting titles include, for example, the use of mood
26 questions, searching for authors, and keyword searching. Using the instruction memory
27 732 and menu generation hardware (e.g., 607) of the viewer 266, a series of mood
28 questions can be presented on menus to determine a subscriber's interest at a particular

1 time. For this methodology, the operations center's 250 processor 404 and instruction
2 memory 416 assign each title mood indicators (and subindicators) from a group such as
3 light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old
4 theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent
5 to the home system 258 with the text data and are stored in library memory 600. Based
6 upon the subscriber entries, the processor 404 associates a set of indicators with the
7 subscriber's request and a set of electronic books with matching indicators are located for
8 suggesting to the subscriber.

9 Responsive searches for authors or keywords (a search word provided by the
10 subscriber) are generally performed by the library processor 628 and instruction memory
11 632 on data stored in the library memory 600. For example, a keyword given by the
12 subscriber may be searched for a match in library memory 600 storing the book reviews,
13 critics and previews databases. Thus, if a subscriber provided an entry of the word
14 "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located
15 by the library processor 628 using instruction from a routine in the instruction memory
16 632.

17 Intelligent methods of suggesting programs include analyzing personal profile
18 data on the subscriber and/or historical data about the subscriber such as past books
19 ordered by the subscriber (or buy data). This method is preferred in a book on demand
20 system and can be performed at the distribution point or operations center 250 by the on-
21 site processor 404 using subscriber databases stored in memory 428. The home system
22 258 receives the text data including program suggestion information from the distribution
23 point or operations center 250 and generates the program suggestion submenus 855, 856,
24 857 using the same text data receiving 212 and viewer menu generation hardware (e.g.,
25 607, 621) described above. Software routines and algorithms stored in instruction
26 memories (e.g. 632, 732) are used to analyze historical data and book ordered data to
27 determine a line of books to suggest to the subscriber.

1 The algorithms for this powerful feature of suggesting books or authors to
2 subscribers are disclosed in great detail in U.S. Patent No. 5,559,549, entitled
3 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON
4 A TELEVISION PROGRAM DELIVERY SYSTEM, issued September 24, 1996, and
5 are incorporated herein by reference.

6 Referring to Figure 13, submenus 858 are shown on the "Books In Your Library"
7 submenu 872 and are preferably broken into shelf numbers with submenus for each shelf
8 874, 876. The submenus 858 for the "Books You Can Order" submenu 878 is similarly
9 broken out into submenus by shelves 880, 882. These shelves may each be a category or
10 genre of books. Electronic books may be grouped into categories such as best sellers,
11 novels, fiction, romance, etc. See Figure 14d.

12 Referring to Figure 13, the submenu 858 for "Your Current Book" 884 allows a
13 subscriber to select a current book 884 and then determine what page to view. This
14 selection is confirmed with a level two submenu 885. The help submenu 887 provides
15 the subscriber with additional help screens 888. The submenus 858 for available features
16 890 are preferably broken out into a sequence of separate submenus for each feature 891,
17 892.

18 Referring to Figure 13, messages can also be sent with the delivery system 200.
19 A level one message screen provides the subscriber with the ability to select from various
20 messages the subscriber has pending 893. Each message is then shown on a separate
21 submenu screen 894, 895. The message may contain text and graphics.

22 Referring to Figure 13, account information is shown on a level one submenu 896
23 and then follow-on submenus 858 show the recent orders and your account balance 897.
24 There is also a level one submenu for outgoing messages 898 which has a follow-on
25 submenu used as an input screen 899.

26 In addition to the specific features and submenus described in Figure 13 and
27 Figure 14a through Figure 14j, many other variations and features are possible. When

1 a book is finally selected for viewing the title page 886 will appear on the screen followed
2 by a page of text.

3 **III. The Billing And Collection System**

4 The billing and collection system 278 (shown in Figures 2 and 3) utilizes the
5 latest technology in electronic transaction and telephone switching to track orders,
6 authorize deliveries, bill consumers, and credit publishers automatically. The telephone
7 calls initiated by the phone connector 270 are received by the billing and collection
8 system 278 which responds immediately without human intervention by placing the order
9 and charging the consumers credit card account. Data is compiled periodically and
10 publishers 282 are credited for sales of their books or other text. The billing and
11 collection system 278 may also connect with subscribers through two-way cable
12 connections, cellular, or other communication means.

13 It is preferred that the billing and collection system 278 communicate with the
14 operations center 250 to track changes in available books and to provide statistical data
15 to the operations center 250.

16 **IV. Public Library, School, and Bookstore System**

17 The electronic book system can be modified to be used at public libraries, schools
18 and bookstores. Figure 15 shows one possible arrangement of components for a public
19 library, school or bookstore location. The main unit at a public library, school or
20 bookstore is the file server 900. The file server 900 is a large electronic memory unit that
21 can store thousands of electronic books. Various electronic storage means may be used
22 in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs.

23 The system comprises five components; the file server 900, a converter or video
24 connector 904, a controller 908, a viewer 912, and a catalog printer 916. The software
25 for controlling the system is primarily located in the controller 908. The converter or
26 video connector 904 is similar to those described above. In this configuration the
27 controller unit 908 monitors the data being transferred to the file server 900 by the
28 converter 904. The controller 908 is preferably provided with a viewing screen and

1 several control buttons. When it is necessary to have a larger screen to perform more
2 sophisticated controlling of the system a viewer 266 may be connected to the controller
3 908 and the viewer screen and controls 740 may be used.

4 The controller 908 is only able to download books to public viewers 912 which
5 are authorized to receive books from the particular file server 900. For security reasons
6 it is not desirable that the public viewer 912 have access to more than one file server 900.
7 In this way, security can be maintained over the text data for books. It is preferred that
8 the public viewer 912 be limited to receiving one or two electronic books at a time from
9 the controller 908. When the subscriber of the public viewer 912 needs a new or
10 additional electronic book, the subscriber returns the viewer 912 to the school or public
11 library where the subscriber receives a new electronic book from the controller 908.

12 In order to track the electronic books that are available on the file server 900, the
13 titles of the available books may be printed on a catalog printer 916. The catalog printer
14 916 is connected to the library controller 908 and the titles of the electronic books are
15 downloaded to the catalog printer 916. None of the coded text for any of the electronic
16 books can be printed using the controller 908 and catalog printer 916 of this system. In
17 order to maintain security over the data, none of the electronic book data is allowed to be
18 downloaded to the printer 916. Once a complete printout of available electronic book
19 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can
20 be maintained at the file server 900.

21 The system shown may also be used at bookstores. The bookstores can rent the
22 public viewer 912 to customers with the text for one or two electronic books loaded onto
23 the public viewer 912. The public viewer 912 may be provided with an automatic
24 timeout sequence. The timeout sequence would erase the textual data for the books after
25 a certain period of time, for example, two weeks. It is expected that after a period of time
26 (perhaps within two weeks) the renter would return the public viewer 912 to the
27 bookstore and receive additional electronic books for viewing. Using this arrangement,
28 it is also possible for the bookstore to (permanently) sell a viewer 912 to a regular

1 customer. The customer then returns to the bookstore from time to time to receive textual
2 data for an electronic book which the customer can then store permanently on the
3 customer's own viewer 912. Various other configurations are possible for bookstores,
4 schools and public libraries using the file server 900 and public viewer 912 described.

5 **V. Use of a Set Top Converter**

6 Existing set top converters such as those made by Scientific Atlanta or General
7 Instruments are presently unequipped to handle the delivery system 200 of the present
8 invention. Although set top converters may be built which include the library functions,
9 hardware modifications are necessary in order to use the delivery system 200 with
10 existing set top converter technology.

11 Figures 16a and 16b are examples of hardware modifications or upgrades. A port
12 is used to attach hardware upgrades described below to a set top terminal. Two upgrades
13 are possible to set top converters 601 to assist in receiving and selecting electronic books.
14 A menu generation card upgrade (Figure 16a) and an information download unit (Figure
15 16b). Each of these upgrades may be connected to the set top terminal unit through an
16 upgrade port. A four wire cable, ribbon cable, IEEE 1394 firewire interface, USB
17 interface, or the like may be used to connect the upgrade to the set top converter 601.

18 A card addition 950 to a set top converter 601 is depicted in Figure 16a. The card
19 950 shown provides the additional functionality needed to utilize the book selection
20 system with existing set top converter 601 technology. The card 950 may be configured
21 to slip inside the frame of a set top terminal and become part of the set top terminal, an
22 advanced set top terminal. The primary functions the card 950 adds to the set top
23 converter 601 are the interpreting of data signals, generating of menus, sequencing of
24 menus, and, ultimately, the ability of the subscriber to select an electronic book using
25 either the television or a viewer 266. The card 950 also provides a method for a remote
26 location, such as the cable headend, to receive information on electronic books ordered.
27 The electronic books ordered information and control commands may be passed from the
28 cable headend to the card 950 using telephone lines.

1 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic
2 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver
3 962, demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the
4 data text signal from the cable headend through the coaxial cable. The logic circuitry 958
5 of the card 950 receives data 964, infrared commands 966, and synchronization signals
6 (not shown) from the set top converter 601. Menu selections made by the viewer 266 on
7 the remote control are received by the set top converter's 601 IR equipment and passed
8 through to the card 950. The card 950 interprets the IR signal and determines the
9 electronic book (or menu) the subscriber has selected. The card 950 modifies the IR
10 command to send the information to the set top converter 601. The modified IR
11 command contains the channel information needed by the set top converter 601. Using
12 the phone line 968 and dialer 611', the card 950 is able to transmit electronic books
13 ordered information to the cable headend. It is also possible to receive the electronic
14 books over the telephone lines and by-pass the video distribution system. In this
15 embodiment, the telephone system may be used to provide access to an Internet web site
16 to order and receive electronic books.

17 These commands are passed through the interface linking the set top terminal's
18 microprocessor with the microprocessor of the hardware upgrades. In this way,
19 subscriber inputs, entered through the set top terminal keypad or remote control, can be
20 transferred to any of the hardware upgrades for processing and responses generated
21 therein can then be sent back to the set top terminal for display. In a preferred
22 embodiment the IR commands 966 are transferred from set top terminal 601 to hardware
23 upgrade.

24 Hardware upgrades may include a microprocessor, interactive software,
25 processing circuitry, bubble memory, and a long-term memory device. In addition to
26 these basic components, the hardware upgrade may make use of an additional telephone
27 modem or CD-ROM device.

1 The information download hardware upgrade 1001 (shown in Figure 16b) allows
2 the subscriber to download large volumes of information from the operations center 250
3 or cable headend using the set top converter 601. The hardware upgrade 1001 will enable
4 subscribers to download data, such as electronic books and magazines, to local storage.
5 Primarily, the hardware upgrade 1001 is an additional local storage unit 1003 (e.g., hard
6 disk, floppy, optical disk or magnetic cartridge and may include a microprocessor 1005,
7 instruction memory 1007, and a random access memory 1009, as shown in Figure 16b).
8 Preferably, a small portable viewer 266 is also provided with the upgrade 1001 to enable
9 downloaded text to be read without the use of a TV.

10 The downloadable information may be text or graphics supplied by the operations
11 center 250 or cable headend. With this upgrade, electronic books may be downloaded
12 and read anywhere with the portable viewer 266. Using this upgrade, books may be
13 downloaded and stored in compressed form for later decompression. The electronic
14 books would be decompressed only at the time of viewing. Important text that the public
15 desires immediate access may be made available through this system. Text such as the
16 President's speech, a new law, or a recent abortion decision rendered by the Supreme
17 Court may be made immediately available.

18 In one embodiment, electronic book ordering information is stored at each set top
19 terminal until it is polled by the cable headend using a polling request message format.
20 An example of a polling request message format consists of six fields, namely: (1) a
21 leading flag at the beginning of the message, (2) an address field, (3) a subscriber region
22 designation, (4) a set top terminal identifier that includes a polling command/response
23 (or P/F) bit, (5) an information field, and (6) a trailing flag at the end of the message. A
24 similar response frame format for information communicated by the set top terminal to
25 the cable headend in response to the polling request may be used.

26 Figure 17 shows a preferred set top converter that includes a data receiver 617'
27 and a data transmitter 1011. The data transmitter provides upstream data
28 communications capability between the set top converter 601 and the cable headend.

1 Upstream data transmissions are accomplished using the polling system described and,
2 using a data transmitter 1011. Both receiver 617' and transmitter 1011 may be built into
3 the set top converter 601 itself or added through an upgrade module. Regardless of the
4 specific hardware configuration, the set top terminal's data transmission capabilities may
5 be accomplished using the hardware shown in Figure 17.

6 Figure 17 shows RF signals, depicted as being received by a data receiver 617'
7 and tuner 613 working in unison. Both of these devices are interfaced with the
8 microprocessor 1013, which receives inputs 1015, from the subscriber, either through a
9 set top converter's keypad, a remote control unit or the viewer 266. All cable signals
10 intended for reception on the subscriber's TV are accessed by the tuner 613 and
11 subsequently processed by the processing circuitry 1017. This processing circuitry 1017
12 typically includes additional components (not shown) for descrambling, demodulation,
13 volume control and remodulation on a Channel 3 or 4 TV carrier.

14 Data targeted to individual set top converters is received by the data receiver 617'
15 according to each set top converter's specific address or ID. In this way, each addressable
16 set top converter only receives its own data. The data receiver 617' may receive set top
17 converter 601 specific data in the information field of the signal frame described or on
18 a separate data carrier located at a convenient frequency in the incoming spectrum.

19 The received data includes information regarding electronic books and menus
20 available for selection. The subscriber may enter a series of commands 1015 using a
21 keypad or remote control in order to choose an electronic book or menu. Upon receipt
22 of such commands, the microprocessor 1013 instructs the tuner to tune to the proper
23 frequency of the channel carrying data and subsequently instructs the processing circuitry
24 to begin descrambling of this data.

25 Upon selection of the electronic book, the microprocessor 1013 stores any
26 selection information in local memory (not shown) for later data transmission back to the
27 cable headend. The microprocessor 1013 coordinates all CATV signal reception and also
28 interacts with various upstream data transmission components. Typically, the data

1 transmitter 1011 operates in the return frequency band between 5 and 30 MHZ. In an
2 alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless,
3 however, of the frequency band used, the data transmitter 1011 sends information to the
4 cable headend in the information field of the response frame described. Those skilled in
5 the art will recognize that a number of variations and combinations of the above-
6 described set top terminal hardware components may be used to accomplish upstream
7 data transmissions.

8 **VI. Books-On-Demand System**

9 The electronic book system 200 described may also be configured in a book-on-
10 demand style. Figure 18a shows one example of a configuration for a books-on-demand
11 system. A books-on-demand system requires more powerful two-way communications
12 between the consumer's home, bookstore, school or public library and either the
13 operations center 250 or a distribution site 1020 such as the cable headend. This type of
14 two-way communication can be provided by the hardware shown in Figure 17 and
15 described above.

16 Referring to Figure 18a, in a books-on-demand system, the subscriber selects the
17 electronic book to be download from an available menu of electronic books (see for
18 example Figures 14d and 14e). The data for menus of available books is usually sent to
19 the subscriber location by the distribution site 1020. After the subscriber's menu
20 selection, information about the subscriber selection (or request) is then communicated
21 to either a distribution point 1020 (such as a cable headend or an Internet web site) or the
22 operations center 250. Upon receipt of this request, the needed textual and graphical
23 information for the book is spooled and sent to the subscriber. In this manner, books are
24 only sent when requested by the subscriber and are sent immediately upon demand for
25 the book (or text).

26 In order to support such a books-on-demand system, the text delivery and
27 distribution must be conducted on a strong nodal architected distribution system, such

1 as, a video-on-demand cable or telephone television system, an Internet web site, or
2 through use of individual telephone access on the public telephone system.

3 The books-on-demand system allows for a greater selection of electronic books
4 to the subscriber and limits the amount of communicated book data that is unnecessary
5 or unneeded. It also provides the electronic book to the subscriber in a much timelier
6 fashion.

7 In addition to a stronger distribution system, a books-on-demand system requires
8 a distribution point 1020 to have more sophisticated equipment to access and "spool out"
9 the textual information. This can be accomplished using file server technology 1024 for
10 storing the electronic books and ATM 1028 or telephone-type switching (not shown) to
11 distribute the textual information. The file server 1024 and distribution technology that
12 can be used in configuring such a books-on-demand system is described in U.S. Patent
13 No. 5,262,875 and U.S. Patent No. 5,218,695, cited above.

14 Figure 18a shows an embodiment for a books-on-demand system that utilizes file
15 server technology. In addition to electronic books, the embodiment of Figure 18a will
16 support distribution of nearly any digital data. Electronic books or textual files are
17 received from publishers 282 and other sources through local feeds 1032, ATM 1028, or
18 by satellite dish 1036. The data is then stored in memory 1040 at the file server 1024.
19 The distribution point 1020 may be a cable headend that receives requests from
20 subscribers and delivers text to subscribers over a two-way communication system (such
21 as a video-on-demand system (VOD) 1044). Alternately, an Internet web site may serve
22 as the distribution point 1020.

23 The library unit 262 can be connected to either a basic premium-type service cable
24 system 1048, a near video-on-demand type cable system (or pay-per-view (PPV) 1052)
25 or a video-on-demand cable system 1044. In connecting with either of these three
26 systems the library unit 262 may access the cable directly or may access the system
27 through a set top terminal 601', 601", or 601"".

1 Using the two-way video-on-demand system 1044, a subscriber is able to request
2 a specific electronic book title and receive that text immediately following its request.
3 To accomplish this, the distribution point 1020 transmits a list of available electronic
4 books through the cable delivery system to the library unit 262. The library unit 262
5 displays the list of available electronic books on a menu or similar format. As described
6 earlier, it is preferred that the library unit 262 use menus which list categories of available
7 electronic books to form its request from the distribution point 1020. After selecting an
8 electronic book, the library unit 262 sends a request signal on the two-way
9 communication system 1044 back to the distribution point 1020. This request signal can
10 be handled in two ways. The library unit 262 either initiates the request or the
11 distribution point 1020 polls the various libraries on to the two-way system 1044. Upon
12 receiving the request for the electronic book title, the text associated with that book title
13 is transmitted to the library unit 262 using the two-way cable system 1044.

14 Figure 18b is an expanded view of a preferred operations center 250 that supports
15 a regional or national books-on-demand system. In fact, the operations center 250 shown
16 supports distribution of nearly any digital data. The operations center 250 supports
17 multiple feeds to receive digital information by tape 1060, 1060', ATM 1028, or satellite
18 1036. The information is processed through an input MUX 1064 and a small file server
19 1068 before reaching the master file server 1072. Digital data such as electronic books
20 received from publishers 282 is then stored on the master file server 1072. It is preferred
21 that the digital data is stored compressed in a standard format such as MPEG2.

22 A system controller 1076 provides control over the regional or national books-on-
23 demand system. Electronic books may be packaged into groups to provide feeds to
24 various cable headends. In addition, scheduling and marketing research are conducted
25 at the operations center 250. In order to handle the scheduling and market research,
26 electronic book buy data is received at the operations center 250 through a multiplexer
27 1082. Electronic book buy information can be provided by the operation center 250 to
28 the billing and collection system 278.

1 The operations center 250 is also equipped to insert messages or advertisements
2 into the file server. These messages or advertisements will eventually be received by the
3 subscribers.

4 The master file server 1072 uses an output multiplexer 1080 and ATM 1028 as
5 well as satellite connections to distribute digital data. In a preferred embodiment, cable
6 headends receive text data on electronic books from the master file server 1080 through
7 the output multiplexer 1028 and an ATM system 1028. After receiving the electronic
8 book data, the cable headends store the books in a local file server 1024. Figure 18a's
9 distribution point 1020 is an example of a cable headend which may receive data from
10 the operations center 250 of Figure 18b through an ATM hookup 1088 or satellite
11 hookup.

12 **VII. Voice Emulation Features for Electronic Books**

13 Figure 19 is a diagram of a main menu screen 1100 for presenting on the viewer
14 266 voice emulation options for electronic books. Main menu 1100 may be displayed on
15 the viewer 266 for permitting a user to select various options relating to voice emulation
16 in electronic books. Main menu 1100 has a number of sections for permitting the user
17 to select the options by selecting an appropriate section. The term section refers to a
18 definable portion of the screen, and the act of selecting a section may involve, for
19 example, positioning the cursor or a pointer over the section using trackball 743 and
20 depressing selection button 745 to "click on" the section; other cursor-control devices,
21 including peripheral devices, may be used to select a section either by positioning the
22 cursor or by entering a particular command. The sections in main menu 1100, and other
23 described screens, may alternatively have different shapes and may be displayed in a
24 different configuration than that shown. In addition, the screens may have more or fewer
25 sections depending upon, for example, desired functions or displayed information. Also,
26 main menu 1100 and the other described screens may be generated for display on the
27 viewer 266, or retrieved from memory for display, by library processor 628 operating
28 under control of software modules residing within the instruction memory unit 632 or by

1 viewer processor 621 operating under control of software residing within the instruction
2 memory 732, or by hardware modules, or a combination of hardware and software
3 modules. A keyboard may be used with the viewer and key strokes may be used for
4 commands. Alternatively, a soft keyboard may be displayed on the viewer 266 and may
5 be used to enter commands.

6 A manual text-to-speech section 1102 permits the user to select an option to
7 convert text within a displayed electronic book to corresponding speech. The phrase text-
8 to-speech refers to conversion of text in electronic form to corresponding speech. An
9 auto text-to-speech section 1104 with auto page turn permits a user to select an option to
10 have the viewer continuously convert text to speech from page to page within an
11 electronic book. An auto text-to-speech section 1106 with manual page turn permits a
12 user to select an option to have the viewer 266 automatically convert an entire page of
13 displayed text to speech. For the various text-to-speech conversion features, the viewer
14 266 may use speaker/microphone 608' to convert text in electronic form to corresponding
15 speech.

16 A view book section 1108 permits a user to select an option to view an electronic
17 book. A settings section 1110 permits a user to select an option to view a settings menu
18 and enter various parameters relating to the voice emulation features. Settings are various
19 parameters relating to controls of an electronic book and associated functions. A
20 dictation section 1112 permits a user to select an option to perform dictation into an
21 electronic book. The term dictation refers to conversion of speech to corresponding text
22 in electronic form capable of display on a viewer or other display device.

23 Figure 20 is a flow chart of a main menu process 1120 for processing options
24 selected by a user in main menu 1100. Main menu process 1120 may be implemented
25 within the viewer 266, the library 262, or a combination; for example, it may be
26 implemented by software modules residing within the instruction memory unit 632 for
27 execution by the library processor 628 or within the instruction memory 732 for
28 execution by the viewer processor 621, or by hardware modules, or a combination of

1 hardware and software modules. A display process 1122 displays main menu 1100 on
2 the viewer 266, and a select process 1124 receives a user's selected option within main
3 menu 1100. A decision process 1123 determines if a voice security function has been
4 activated and, if so, main menu process executes a voice security routine 1125, further
5 explained below. Voice security is a feature permitting only users with a particular voice
6 pattern or characteristic to have access to content of the viewer 266 or electronic books
7 stored within the viewer 266 or library 262. As a result of voice security routine 1125,
8 an authorization routine 1127 determines if the user has authorization for the requested
9 function.

10 If the user has authorization, an option process 1126 executes processing for the
11 selected option. In particular, depending upon which option the user selected, various
12 routines are performed. If the user selected manual text-to-speech section 1102, a speech
13 process 1128 executes a manual text-to-speech routine 1130. If the user selected auto
14 text-to-speech section 1104, a speech process 1132 executes an auto text-to-speech (auto
15 page turn) routine 1134. If the user selected auto text-to-speech section 1106, a speech
16 process 1136 executes an auto text-to-speech (manual page turn) routine 1138. If the user
17 selected setting section 1110, a settings process 1140 executes a settings routine 1142.
18 If the user selected dictation section 1112, a dictation process 1144 executes a dictation
19 routine 1146. If the user selected view book section 1108, a view book process 1148
20 executes a view book routine 1150.

21 Figure 21 is a flow chart of manual text-to-speech routine 1130. Manual text-to-
22 speech routine 1130 may be implemented within the viewer 266, the library 262, or a
23 combination; for example, it may be implemented by software modules residing within
24 the instruction memory unit 632 for execution by the library processor 628 or within the
25 instruction memory 732 for execution by the viewer processor 621, or by hardware
26 modules, or a combination of hardware and software modules. In routine 1130, a display
27 process 1160 displays a book menu. Figure 22 illustrates a book menu screen 1190 for
28 display on the viewer 266 and for displaying a book menu on the viewer 266. Book

1 menu screen 1190 includes sections 1192, 1194, and 1196 identifying stored electronic
2 books. A selection process 1162 receives a user's selected electronic book from book
3 menu screen 1190, and a display process 1164 displays the selected electronic book on
4 the viewer 266. A user may select an electronic book by positioning the cursor on a
5 section identifying the electronic book and selecting the section or by entering a particular
6 command. In using a voice commands mode, a user may speak the title of a particular
7 electronic book, or other identifying information, in order to select it.

8 Figure 23 illustrates a text screen 1200 for display on the viewer 266 and for
9 displaying a page of an electronic book. The text screen 1200 also includes various
10 sections for a user to enter commands. In particular, a user may select a page section
11 1208 and enter a page number into the section in order to jump to another page of the
12 displayed electronic book. The user may select page turn sections 1210 and 1212 to page
13 backward and forward, respectively, in the displayed electronic book. The user may
14 select a convert section 1206 to convert selected text to speech and select a pause section
15 1202 and a resume section 1204 to pause and resume, respectively, the text-to-speech
16 with manual page turn conversion. A define section 1207 permits the user to receive
17 definitions, in speech form, of words selected in the text.

18 A display pages process 1166 displays pages of the electronic book as selected by
19 the user by selecting, for example, a page section 1208 and page turn sections 1210 and
20 1212. An indication process 1168 indicates any text selected by a user. Figure 24
21 illustrates an example of selected text 1214 in the text screen 1200. Although selected
22 text is shown as shaded in the text screen 1200, selected text may be indicated in other
23 ways such as by showing it underlined, in a different color than surrounding text, in
24 reverse video, in a different font than surrounding text, in bold, or in another manner that
25 distinguishes the selected text from surrounding text or information. A selection process
26 1170 receives the user's selection of convert section 1206 and, in response, a decision
27 process 1172 determines if the user has selected text. If no text is selected, a display
28 process 1174 may optionally display an error message indicating that text must be

1 selected for conversion to speech in this mode. If text is selected, a conversion process
2 1176 converts the selected text to speech using, for example, a text-to-speech conversion
3 program. Text-to-speech conversion programs are known in the art and examples include
4 those programs disclosed in the following U.S. patents, which are incorporated herein by
5 reference: U.S. Patent 5,848,390, entitled SPEECH SYNTHESIS SYSTEM AND ITS
6 METHOD; U.S. Patent 5,774,854, entitled TEXT TO SPEECH SYSTEM; U.S. Patent
7 5,682,501, entitled SPEECH SYNTHESIS SYSTEM; U.S. Patent 5,220,629, entitled
8 SPEECH SYNTHESIS APPARATUS AND METHOD; and U.S. Patent 5,113,449,
9 entitled METHOD AND APPARATUS FOR ALTERING VOICE
10 CHARACTERISTICS OF SYNTHESIZED SPEECH. Other examples include products
11 developed by the AT&T Advanced Speech Products Group. The Advanced Speech
12 Products Group can be accessed at www.research.att.com/projects/watson/index.html.

13 Alternatively, underlying pointers tied to text can correspond to pointers in a pre-
14 recorded and stored audio version of the text, avoiding the need for real-time text-to-
15 speech conversion. In that example, an electronic book file may contain both the text and
16 corresponding audio files or links to them. The audio files or links to them may be stored
17 within a header file for each electronic book. The information contained in the header
18 file is used to identify and categorize each electronic book for display and other purposes,
19 such as searching. As new electronic books are loaded on the viewer 266 or library unit
20 262, this header information is extracted from the header file and stored in a database
21 resident on the viewer 266 or library unit 262, such as in memory 600 or 600'.

22 The header information associated with each electronic book typically includes
23 the information shown in Table 1 and can be stored, for example, in records or other
24 database structures. The header file may contain a field for storing an audio file
25 corresponding to text in the electronic book, and may alternatively contain a field
26 identifying a link to such an audio file. The audio files may contain an audio version of
27 the entire text of the electronic book or a portion of it. In addition, multiple audio files
28 may be used for discrete elements or portions of text in the electronic book, and may

1 potentially be linked together based upon text selected by a user for conversion to
 2 corresponding speech or audio.

3 **Table 1**

4	Title:	
5	Authors:	
6	Primary Author:	
7	Author 2:	
8	Author 3:	
9	Author 4:	
10	Author 5:	
11	ISBN #:	
12	Library of Congress # (LC#)	
13	Dewey Decimal Classification # (DDC#)	
14	Publisher:	
15	Edition Number:	
16	Date of Publishing:	
17	Related Categories:	
18	Category 1	Category 6
19	Category 2	Category 7
20	Category 3	Category 8
21	Category 4	Category 9
22	Category 5	Category 10
23	Related Keywords:	
24	Keyword 1	Keyword 6
25	Keyword 2	Keyword 7
26	Keyword 3	Keyword 8
27	Keyword 4	Keyword 9
28	Keyword 5	Keyword 10
29	User Defined Criteria 1:	
30	User Defined Criteria 2:	
31	User Defined Criteria 3:	
32	User Defined Criteria 4:	
33	User Defined Criteria 5:	
34	Book Summary/Description:	
35	User Entered Notes:	
36	Audio file:	
37	Link to audio file:	
38		

39 During the conversion, a selection process 1178 detects if the user has selected
 40 pause section 1202. In response, a halt process 1180 stops the text-to-speech conversion
 41 of the selected text. When the user selects a resume section 1204, as detected by a
 42 selection process 1182, the conversion process 1176 resumes the text-to-speech

1 conversion of the selected text at a point where it was stopped. A decision process 1184
2 determines if the user has closed the displayed electronic book and, if so, a return process
3 1186 returns to the main menu to the display screen 1100. A user may close a displayed
4 electronic book by selecting an icon displayed on the screen, for example, or by entering
5 via a keyboard or other device a particular command.

6 In addition, a user may request and receive a definition, in speech form, of a word
7 selected in the text. After selecting a word or words in the selection process 1168, a user
8 selection process 1161 receives a user's selection of a define section 1207. In response,
9 a decision process 1163 determines if text is selected; if not, display process 1174
10 displays the optional error message. If text is selected, a retrieve process 1165 retrieves
11 a definition for the selected word or words from an electronic dictionary, and a
12 conversion process 1167 converts the definitions from an electronic dictionary to speech
13 form. Electronic dictionaries are known in the art and an example includes the system
14 disclosed in U.S. Patent No. 4,831,654, entitled APPARATUS FOR MAKING AND
15 EDITING DICTIONARY ENTRIES IN A TEXT TO SPEECH CONVERSION
16 SYSTEM, which is incorporated herein by reference. During the conversion, a user may
17 select the pause section 1202, as detected by the selection process 1169, and in response
18 a halt process 1171 stops the speech-form definition. When a user selects the resume
19 section 1204, as detected by a selection process 1173, the conversion process 1167
20 continues to provide the speech-form definition of the selected word or words at a point
21 where it was stopped.

22 Figure 25 is a flow chart of auto text-to-speech routine 1134 with an auto page
23 turn feature. Auto text-to-speech routine 1134 may be implemented within the viewer
24 266, the library 262, or a combination; for example, it may be implemented by software
25 modules residing within the instruction memory unit 632 for execution by the library
26 processor 628 or within the instruction memory 732 for execution by the viewer
27 processor 621 using software modules, or by hardware modules, or a combination of
28 hardware and software modules. In the auto text-to-speech routine 1134, a display

1 process 1220 displays a book menu, such as the book menu screen 1190. A selection
2 process 1222 receives a user's selected book from the book menu, and in response a
3 display process 1224 displays the selected electronic book such as in the text screen 1200
4 shown.

5 A conversion process 1226 continuously converts text to speech in the displayed
6 book from page to page using, for example, a text-to-speech conversion program. In
7 addition, the conversion process 1226 automatically turns the pages to display a current
8 page for which text-to-speech conversion occurs. Text-to-speech conversion programs
9 are known in the art and examples include those programs disclosed in the text-to-speech
10 conversion program patents identified above and the products developed by the AT&T
11 Advanced Speech Products Group. Alternatively, the header file for the electronic book
12 may contain an audio file of the text of the electronic book, or a link to such a file, for
13 presentation of the text in speech form. During the conversion, a user may select the
14 pause section 1202, as detected by a selection process 1228, and in response a halt
15 process 1230 stops the text-to-speech conversion. If a user selects the resume section
16 1204, as detected by a selection process 1232, the conversion process 1226 resumes the
17 text-to-speech conversion at a point where it was stopped. Once the entire electronic
18 book has been converted, or the user closes the electronic book as determined by a close
19 book process 1227, a return process 1234 returns to the main menu to display the main
20 menu screen 1100 (shown in Figure 9).

21 Figure 26 is a flow chart of auto text-to-speech routine 1138 with a manual page
22 turn feature. Auto text-to-speech routine 1138 may be implemented within the viewer
23 266, the library 262, or a combination; for example, it may be implemented by software
24 modules residing within the instruction memory unit 632 for execution by the library
25 processor 628 or within the instruction memory 732 for execution by the viewer
26 processor 621, or by hardware modules, or a combination of hardware and software
27 modules. In the auto text-to-speech routine 1138, a display process 1240 displays a book
28 menu, such as book menu screen 1190. A selection process 1242 receives a user's

1 selected book from the book menu, and in response a display process 1244 displays the
2 selected electronic book such as in the text screen 1200.

3 A conversion process 1246 continuously converts text to speech in the displayed
4 book from the displayed page using, for example, a text-to-speech conversion program.
5 Text-to-speech conversion programs are known in the art and examples include those
6 programs disclosed in the text-to-speech conversion program patents identified above and
7 the products developed by the AT&T Advanced Speech Products Group. Alternatively,
8 the header file for the electronic book may contain a separate audio file of the text of each
9 page of the electronic book, or links to such files, for presentation of the text in speech
10 form for the pages as selected by a user. In particular, when a user selects a particular
11 page, the conversion process 1246 may retrieve the corresponding audio file to present
12 the text on that page in speech form. A decision process 1254 determines if the text-to-
13 speech conversion has reached the end of the displayed page and, if not, the conversion
14 continues for the displayed page. During the conversion, the user may select pause
15 section 1202, as detected by a selection process 1248, and in response a halt process 1250
16 stops the text-to-speech conversion. If a user selects the resume section 1204, as detected
17 by a selection process 1252, the conversion process 1246 resumes the text-to-speech
18 conversion at a point where it was stopped.

19 Once the textual content of the current page of the displayed electronic book has
20 been converted, as determined by decision process 1254, a decision process 1256
21 determines if the end of the book is displayed. If the electronic book has more pages for
22 display, a wait process 1258 waits for the user to select another page. A selection process
23 1260 receives the user's next selected page and in response returns to conversion process
24 1246 to perform text-to-speech conversion for the next displayed page using, for
25 example, a text-to-speech program, as are known in the art, or using corresponding audio
26 files. If the end of the book is displayed, as determined by decision process 1256, or if
27 the user closes the book as determined by a close book process 1253, a return process
28 1262 returns to the main menu to display the main menu screen 1100.

1 Figure 27 is a flow chart of a settings routine 1142. The settings routine 1142
2 may be implemented within the viewer 266, the library 262, or a combination; for
3 example, it may be implemented by software modules residing within the instruction
4 memory unit 632 for execution by the library processor 628 or within the instruction
5 memory 732 for execution by the viewer processor 621, or by hardware modules, or a
6 combination of hardware and software modules. In the settings routine 1142, a display
7 process 1270 displays a settings menu.

8 Figure 28 illustrates an example of a settings menu screen 1280 for display on the
9 viewer 266. The settings menu screen 1280 includes a voice commands section 1282 to
10 activate and deactivate voice commands by selecting certain activate and deactivate
11 sections 1284 and 1286, respectively. A user may select the activate or deactivate options
12 by, for example, positioning a cursor over the corresponding section next to the desired
13 option and selecting the section, or by entering various other commands such as a
14 particular selection of input keys. Voice or audible commands are the ability of the
15 viewer 266 to execute a function corresponding to a command provided by a user in
16 speech form. The settings menu screen 1280 also includes an available voice commands
17 section 1311, identifying voice or audible commands available to a user and the following
18 exemplary speech required to execute the command: "page forward" command 1303;
19 "page backward" command 1305; "open book" command 1307; and other functions 1309.

20 The settings menu screen 1280 also includes a rate section 1288 for setting a rate
21 of text-to-speech conversion by manipulating a marker 1290 and moving the marker
22 along the displayed rate scale. The term rate refers to the relative speed at which text is
23 converted into corresponding speech. The machine speech conversion can be done
24 electronically in advance, but the speech is provided at a certain pace determined by the
25 user. Text-to-speech conversion programs, along with the ability to change a rate of the
26 conversion, are known in the art and examples include the text-to-speech conversion
27 program patents identified above and the products developed by the AT&T Advanced
28 Speech Products Group.

1 A voice security section 1287 permits a user to activate and deactivate a voice
2 security feature by selecting, respectively, sections 1289 and 1291. A voice security
3 feature provides for activation of the viewer 266 and access to stored electronic books
4 only in response to a voice command from a particular user or particular users.

5 The settings menu screen 1280 also includes a voice options section 1301
6 permitting a user to select various options for speech used to convert text. These options
7 include, for example, a male voice 1313; a female voice 1315; a child's voice 1317; voice
8 option 1 (1319); and voice option N (1321). A user may select one of these options by,
9 for example, positioning a cursor over the corresponding section next to the desired
10 option and selecting the section, or by entering various other commands such as a
11 particular selection of input keys. Other options 1319 and 1321 may represent other types
12 of voices such as user-defined voices, voices with particular characteristics, or the actual
13 author's voice, for example. The other options 1319 and 1321 could also include the
14 voice of a famous person, such as James Earl Jones or an imitation of James Earl Jones,
15 for example. Text-to-speech conversion programs, along with varying types of voices
16 for the conversion, are known in the art and examples include the text-to-speech
17 conversion program patents identified above and the products developed by the AT&T
18 Advanced Speech Products Group.

19 Once the text-to-speech process is executed in the viewer 266, the viewer may
20 display a fixed (JPEG) or moving (MPEG 2) image. The displayed image may be
21 retrieved by the viewer 266 from a specific database related to the electronic book being
22 viewed. Alternatively, the viewer may access such an image using an electronic link.
23 Use of electronic links in an electronic book are described in detail in copending patent
24 Application Serial No. 09/237,828, entitled ELECTRONIC BOOKS ELECTRONIC
25 LINKS, filed January 27, 1999, the disclosure of which is hereby incorporated by
26 reference.

27 As shown in Figure 27, a receive process 1272 receives a user's selected settings
28 in settings menu screen 1280. In response, a save process 1274 saves the selected

1 settings for later use in providing text-to-speech functions or receiving voice commands.
2 The settings may be saved in a table or other data structure in the instruction memory unit
3 632 or within the instruction memory 732 for use in controlling functions related to the
4 electronic books. A decision process 1276 determines if the user closes settings menu
5 screen 1280 and, if so, a return process 1278 returns to the main menu to display the main
6 menu screen 1100.

7 Figure 29 is a flow chart of a dictation routine 1146. The dictation routine 1146
8 may be implemented within the viewer 266, the library 262, or a combination; for
9 example, it may be implemented by software modules residing within the instruction
10 memory unit 632 for execution by the library processor 628 or within the instruction
11 memory 732 for execution by the viewer processor 621, or by hardware modules, or a
12 combination of hardware and software modules. In the dictation routine 1146, a display
13 process 1300 displays a book menu, such as book menu screen 1190. A selection process
14 1302 receives a user's selected book from the book menu, and in response a display
15 process 1304 displays the selected electronic book. A display pages process 1306
16 displays pages of the electronic book as selected by the user.

17 Figure 30a illustrates a text dictation screen 1330 for display on the viewer 266
18 and for use with a dictation routine 1146. The text dictation screen includes a page
19 section 1336 for permitting the user to enter a page number and have that page displayed.
20 Page turn sections 1338 and 1340 permit a user to page backward and forward,
21 respectively, in the displayed electronic book. A begin dictation section 1332 permits a
22 user to begin speech-to-text conversion, and an end dictation section 1334 permits a user
23 to end speech-to-text conversion. Text dictation screen 1330 indicates that, when an
24 insertion point is chosen by the user, speech is converted to text directly within the page
25 of the displayed electronic book at, for example, location 1341. The text insertion point
26 may be indicated by the user positioning a cursor 1343 to a desired location on the page.
27 Figure 30b illustrates that text dictation screen 1330 may also include a separate section

1 1342 for displaying text converted from speech, particularly when the user does not
2 specify an insertion point.

3 A selection process 1308 detects when a user has selected the begin dictation
4 section 1332. In response, a conversion process 1310 receives speech and converts it to
5 corresponding text, and it may receive the speech from the user via speaker/microphone
6 608'. Speech-to-text and speech recognition programs are known in the art and examples
7 include those programs disclosed in the following U.S. patents, which are incorporated
8 herein by reference: U.S. Patent 5,864,805, entitled METHOD AND APPARATUS FOR
9 ERROR CORRECTION IN A CONTINUOUS DICTATION SYSTEM; U.S. Patent
10 5,799,278, entitled SPEECH RECOGNITION SYSTEM AND METHOD USING A
11 HIDDEN MARKOV MODEL; U.S. Patent 5,615,299, entitled SPEECH
12 RECOGNITION USING DYNAMIC FEATURES; U.S. Patent 5,325,462, entitled
13 SYSTEM AND METHOD FOR SPEECH SYNTHESIS EMPLOYING IMPROVED
14 FORMANT COMPOSITION; U.S. Patent 5,313,531, entitled METHOD AND
15 APPARATUS FOR SPEECH ANALYSIS AND SPEECH RECOGNITION; U.S. Patent
16 5,054,074, entitled OPTIMIZED SPEECH RECOGNITION SYSTEM AND METHOD;
17 U.S. Patent 5,050,215, entitled SPEECH RECOGNITION METHOD; and U.S. Patent
18 4,430,726, entitled DICTATION/TRANSCRIPTION METHOD AND
19 ARRANGEMENT. Other examples include products developed by the AT&T Advanced
20 Speech Products Group.

21 A decision process 1312 determines if the user has selected an insertion point for
22 the text, which may be indicated by positioning the cursor. If the user has selected an
23 insertion point, an insert process 1316 inserts the text at the user-selected point.
24 Otherwise, if the user has not selected an insertion point, an insertion process 1314 may
25 insert the text in the separate displayed section 1342. A decision process 1318
26 determines if the user has selected the end dictation section 1334. Until the user selects
27 the end dictation section 1334, conversion process 1310 continues converting speech into
28 text. When the user selects the end dictation section 1334, a decision process 1320

1 determines if the user has closed the book and, if not, the dictation routine 1146 returns
2 to display pages process 1306 in order to continue displaying pages and converting
3 speech into text as requested by the user. If the user closes the book, a return process
4 1322 returns to the main menu to display the main menu screen 1100.

5 Figure 31 is a flow chart of a view book routine 1150. The view book routine
6 1150 may be implemented within the viewer 266, the library 262, or a combination; for
7 example, it may be implemented by software modules residing within the instruction
8 memory unit 632 for execution by the library processor 628 or within the instruction
9 memory 732 for execution by the viewer processor 621, or by hardware modules, or a
10 combination of hardware and software modules. In the view book routine 1150, a display
11 process 1350 displays book menu, such as book menu screen 1190. A selection process
12 1352 receives a user's selected book from the book menu, and in response a display
13 process 1354 displays the selected electronic book.

14 Figure 32 illustrates an example of a view book screen 1370 for displaying on the
15 viewer 266 a cover page 1372 of the selected electronic book. The view book screen
16 1370 also includes page backward section 1374 and page forward section 1376 for
17 permitting a user to page backward and forward, respectively, within the displayed
18 electronic book. A display pages process 1356 displays pages of the selected electronic
19 book as requested by the user. A decision process 1358 determines if the user has closed
20 the displayed electronic book and, if the user closes the book, a return process 1360
21 returns to the main menu to display the main menu screen 1100.

22 The viewer 266 may also incorporate text to speech conversion and text
23 recognition features to guide the user through the menu system 851, shown in Figure 13.
24 For example, software resident on the viewer 266, or on another component of the home
25 system 258 may be used to provide audio prompts related to menu navigation. When the
26 user activates the menu system 851 and is presented with the main menu 854, the viewer
27 266 could provide an audio prompt such as: "Hello John. Do you want to order a new
28 book or read an existing book? Please respond new book or existing book." If the user

1 responds with "existing book," then the software operating on the viewer 266 may
2 display the Books in Your Library submenu 872, and may provide further audio prompts.

3 Figure 33 is a flow chart of a voice commands routine 1380. The voice
4 commands routine 1380 may be implemented within the viewer 266, the library 262, or
5 a combination; for example, it may be implemented by software modules residing within
6 the instruction memory unit 632 for execution by the library processor 628 or within the
7 instruction memory 732 for execution by the viewer processor 621, or by hardware
8 modules, or a combination of hardware and software modules. This routine permits a
9 user to enter commands via speech, rather than manipulating the viewer controls to enter
10 commands. In the voice commands routine 1380, a decision process 1382 determines if
11 the user has activated the voice commands option. If the option is activated, a receive
12 process 1384 receives a voice command, and it may receive the voice command from a
13 user via the microphone 634.

14 A conversion process 1386 converts the voice command to a corresponding
15 electronic signal, and a determination process 1388 determines the requested function by
16 analyzing the electronic signal. Examples of functions corresponding to the command
17 include a turn page forward function 1390 for the viewer 266 to display the next page in
18 the displayed electronic book; a turn page backward function 1392 for the viewer 266 to
19 display the previous page in the displayed electronic book; an open book function 1394
20 for the viewer 266 to display a particular electronic book; or other functions 1396. After
21 determining the requested function, an execute process 1398 executes the requested
22 function. The viewer 266 may display typical voice command options available to assist
23 the user in understanding the voice commands acted upon by the viewer 266 at a given
24 point in time. The determination process 1388 may use speech recognition programs for
25 the determination; such programs are known in the art and include those exemplary
26 systems in the speech-to-text and speech recognition patents identified above and the
27 products available from the AT&T Advanced Speech Products Group.

1 Figure 34 is a flow chart of a voice security routine 1125. Voice security routine
2 1125 may be implemented within the viewer 266, the library 262, or a combination; for
3 example, it may be implemented by software modules residing within the instruction
4 memory unit 632 for execution by the library processor 628 or within the instruction
5 memory 732 for execution by the viewer processor 621, or by hardware modules, or a
6 combination of hardware and software modules. In a voice security routine 1125, a
7 request process 1404 requests an audible signal for security purposes, and it may be
8 requested via a screen on the viewer 266 or in audio form. A receive process 1405
9 receives the requested audible signal using the microphone 634, and a conversion process
10 1406 converts the audible signal to a corresponding electronic signal. A compare process
11 1408 compares the electronic signal with a stored signal, and a decision process 1410
12 determines if the electronic signal satisfies particular criteria in order to determine if the
13 user has authorization for a requested function.

14 The decision process 1410 may use speech recognition programs for the
15 determination; such programs are known in the art and include those exemplary systems
16 in the speech-to-text and speech recognition patents identified above and the products
17 available from the AT&T Advanced Speech Products Group. If the criteria are not
18 satisfied, a deny process 1412 denies authorization to execute commands from the user
19 and, if the criteria are satisfied, a grant process 1414 grants authorization to execute
20 commands from the user. Main menu process 1120 uses the granted or denied status to
21 determine whether to execute a user's requested function.

22 The viewer 266 may also include software that restricts access to specific
23 electronic books based on recognizing a voice of a user. For example, the viewer 266
24 may determine that a particular user is a child, and then limit access to specific electronic
25 books authorized by a parent for that child to view. Alternatively, the viewer could
26 prevent access to specific electronic books designated by the parent. The same access
27 limitation software may be used to limit access by two or more users to content in the
28 viewer 266 or the home system 258. For example, two adult users of a same viewer 266

may limit access by agreeing that only a first adult user views books one through ten, a second adult user only views books eleven through 20, and that both adult users view books 21 through 30.

While this invention has been described in conjunction with the embodiments described above, it is evident that many alterations, modifications and variations will be apparent to those skilled in the art. Accordingly, embodiments of the invention as set forth above are intended to be only illustrative. Various changes may be made without departing from the scope of the invention as defined in the following claims and their equivalents.